



"Perina, Tom/SBO"
<Tom.Perina@ch2m.com>
01/13/2004 10:53 AM

To Christopher Lichens/R9/USEPA/US@EPA, David
Taylor/R9/USEPA/US@EPA
cc
bcc
Subject SAP OU1 - part 3



Omega FSP_bs1060 Revision 2 Draft.pdf



Omega FSP_bs1060 Revision 2 Draft.doc

DRAFT
DRAFT FIELD SAMPLING PLAN
FOR OMEGA CHEMICAL SUPERFUND SITE OPERABLE UNIT 1
REMEDIAL INVESTIGATION/
FEASIBILITY STUDY OVERSIGHT

MONTEBELLO FOREBAY
LOS ANGELES COUNTY, CALIFORNIA

EPA Contract No. 68-W-98-225
EPA Work Assignment No. 174-RBSD-09BC
CH2M HILL PROJECT NO. 183120

Prepared for
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

Prepared by
CH2M HILL
164 West Hospitality Lane
Suite 2
San Bernardino, California 92408

~~October~~ January 2004 2003

DRAFT
FIELD SAMPLING PLAN
FOR OMEGA CHEMICAL SUPERFUND SITE OPERABLE UNIT 1
REMEDIAL INVESTIGATION/
FEASIBILITY STUDY OVERSIGHT

MONTEBELLO FOREBAY
LOS ANGELES COUNTY, CALIFORNIA

U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105
CH2M HILL PROJECT NO. 183120.PP.02

~~October 2003~~ January 2004

NONDISCLOSURE STATEMENT

This document has been prepared for the U.S. Environmental Protection Agency under Contract No. 68-W-98-225. The material contained herein is not to be disclosed to, discussed with, or made available to any persons for any reason without the prior expressed approval of a responsible official of the U.S. Environmental Protection Agency.

U.S. ENVIRONMENTAL PROTECTION AGENCY REGION IX

Plan Title: Draft Field Sampling Plan for Omega Chemical Superfund Site
Operable Unit 01 Remedial Investigation/Feasibility Study
Oversight

Site Name: Omega Chemical Superfund Site

Site Location: Whittier

City/State/Zip: Los Angeles County, California

Site EPA ID#: 09BC

Anticipated Sampling Dates: November 2003-2004

Prepared By: Tom Perina October
January
2004-2003
Date

Agency or Firm: CH2M HILL, Inc.

Address: 164 West Hospitality Lane, Suite 2

City/State/Zip: San Bernardino, California 92408

Telephone: 909/890-9857

EPA Work Assignment Manager: Christopher Lichens Section: SFD-7-4

Telephone: 415/972-3149

FSP Approval Date: _____

* * * * *

Approved: Tom Perina, Ph.D., R.G., C.H.G. Tom Perina Date: October-January 2004,
2003
CH2M HILL Site Manager

Approved: Artemis Antipas, Ph.D. Artemis Antipas Date: October-January 2004,
2003
CH2M HILL Quality Assurance Officer

Approved: Christopher Lichens Date: _____
EPA Work Assignment Manager

Approved: _____ Date: _____
EPA Quality Assurance Officer

* * * * *

Contents

| Section | Page |
|---|-------------------------|
| Acronyms | vi |
| 1 Objectives..... | 1-110 |
| 1.1 Background..... | 1- 110 |
| 1.2 Objectives | 1- 220 |
| 2 Site Background..... | 2-110 |
| 2.1 Location and Topography | 2- 110 |
| 2.2 EPA Activities in the OU-1 Area | 2- 110 |
| 2.3 Hydrogeology..... | 2- 110 |
| 2.3.1 Regional Hydrogeology | 2- 110 |
| 2.3.2 Site Hydrogeology | 2- 330 |
| 2.4 Water Quality | 2- 330 |
| 3 Rationale for Sample Locations, Number of Samples, and Laboratory Analyses.. | 3-110 |
| 3.1 Surface Soil Sample Collection..... | 3- 110 |
| 3.1.1 Assessment of Regulatory Requirements | 3- 110 |
| 3.1.2 Sampling Locations..... | 3- 110 |
| 3.1.3 Number of Samples | 3- 110 |
| 3.1.4 Laboratory Analyses..... | 3- 220 |
| 3.2 Subsurface Soil Sample Collection | 3- 220 |
| 3.2.1 Assessment of Regulatory Requirements | 3- 220 |
| 3.2.2 Sampling Locations..... | 3- 220 |
| 3.2.3 Number of Samples | 3- 220 |
| 3.2.4 Laboratory Analyses..... | 3- 220 |
| 3.3 Soil Gas Duplicate Sample Collection..... | 3- 220 |
| 3.3.1 Assessment of Regulatory Requirements | 3- 220 |
| 3.3.2 Sampling Locations..... | 3- 220 |
| 3.3.3 Number of Samples | 3- 320 |
| 3.3.4 Laboratory Analyses..... | 3- 330 |
| 3.4 Indoor and Ambient Air Duplicate Sample Collection | 3- 330 |
| 3.4.1 Assessment of Regulatory Requirements | 3- 330 |
| 3.4.2 Sampling Locations..... | 3- 330 |
| 3.4.3 Number of Samples | 3- 330 |
| 3.4.4 Laboratory Analyses..... | 3- 330 |
| 3.5 Groundwater Duplicate Sample Collection | 3- 330 |
| 3.5.1 Assessment of Regulatory Requirements | 3- 330 |
| 3.5.2 Sampling Locations..... | 3- 330 |
| 3.5.3 Number of Samples | 3- 430 |
| 3.5.4 Laboratory Analyses..... | 3- 440 |
| 3.6 Sample Labeling..... | 3- 440 |

| | | |
|----------|---|--------------|
| 4 | Request for Analyses | 4-110 |
| 4.1 | Analytical Parameters..... | 4-110 |
| 4.2 | Schedule | 4-110 |
| 5 | Field Methods and Procedures | 5-110 |
| 5.1 | Sample Collection..... | 5-110 |
| 5.1.1 | Surface Soil Samples..... | 5-110 |
| 5.1.2 | Subsurface Soil Samples | 5-110 |
| 5.1.3 | Soil Gas Summa Canister Samples..... | 5-110 |
| 5.1.4 | Ambient and Indoor Air Summa Canister Samples | 5-220 |
| 5.1.5 | Groundwater Samples | 5-220 |
| 5.2 | Sample Containers and Preservatives | 5-220 |
| 5.2.1 | Surface Soil Samples..... | 5-220 |
| 5.2.2 | Subsurface Soil Samples | 5-220 |
| 5.2.3 | Soil Gas Samples | 5-320 |
| 5.2.4 | Ambient and Indoor Air Samples | 5-320 |
| 5.2.5 | Groundwater Samples | 5-330 |
| 5.3 | Decontamination | 5-430 |
| 5.4 | Sample Management Procedures and Documentation..... | 5-430 |
| 5.4.1 | Sample Packaging and Shipment | 5-440 |
| 5.4.2 | Sample Labeling..... | 5-550 |
| 5.4.3 | Sample Documentation..... | 5-550 |
| 5.5 | Quality Control Samples | 5-660 |
| 5.5.1 | Field Blanks | 5-760 |
| 5.5.2 | Laboratory QC Samples..... | 5-760 |
| 5.5.3 | Trip Blanks..... | 5-770 |
| 5.5.4 | Temperature Blanks | 5-770 |
| 6 | Health and Safety Plan..... | 6-110 |
| 7 | References..... | 7-110 |

Appendixes

- A Target Compound Lists and Reporting Limits
- B Sample Shipping and Documentation Instructions
- C Health and Safety Plan

Tables

| | | |
|-----|----------------------------|-----|
| 4-1 | Request for Analyses | 4-3 |
|-----|----------------------------|-----|

Figures

| | |
|-----|----------------------------------|
| 1-1 | Site Location Map |
| 2-1 | Generalized Stratigraphic Column |
| 3-1 | On-Site Sample Location Map |
| 3-2 | Off-Site Sample Location Map |
| 3-3 | Groundwater Sample Location Map |
| 6-1 | Hospital Map |

Acronyms

| | |
|-------------|--|
| ASTM | American Society for Testing and Materials |
| bgs | below ground surface |
| °C | degrees Celsius |
| CDM | Camp Dresser & McKee |
| CDWR | California Division of Water Resources |
| cis-1,2-DCE | cis-1-2-dichloroethene |
| CLP | contract laboratory program |
| CPT | Cone Penetrometer Test |
| COC | chain-of-custody |
| DQO | data quality objective |
| EE/CA | engineering evaluation/corrective action |
| EPA | Environmental Protection Agency |
| Freon 11 | trichlorofluoromethane |
| Freon 113 | trichlorotrifluoromethane |
| ft./ft. | feet per foot |
| FB | field blank |
| FSP | field sampling plan |
| HCl | hydrochloric acid |
| HPLC | high pressure liquid chromatography |
| ID | identification |
| µm/L | micrograms per liter |
| MCL | maximum contaminant limit |
| mg/L | milligrams per liter |
| mL | milliliters |
| MS | matrix spike |
| MSD | matrix spike duplicate |
| msl | mean sea level |
| OPOG | Omega Chemical Site PRP Organized Group |

| | |
|---------------|--|
| OU | operable unit |
| PCB | polychlorinated biphenol |
| PCE | perchloroethylene (tetrachloroethene) |
| PRG | Preliminary Remediation Goals |
| PRP | potentially responsible party |
| QAPP | Quality Assurance Project Plan |
| QAO | Quality Assurance Office |
| QC | quality control |
| <u>RSCC</u> | <u>Region 9 Sample Coordination Center</u> |
| RCRA | Resource Conservation and Recovery Act of 1978 |
| RFA | request for analyses |
| RI/FS | remedial investigation/feasibility study |
| SVOC | semivolatile organic compounds |
| TCE | trichloroethylene |
| TDS | total dissolved solids |
| TOC | total organic carbon |
| VOA | volatile organic analysis |
| VOC | volatile organic compound |
| Weston | Weston Solutions, Inc. |
| 1,1-DCA | 1,1-dichloroethane |
| 1,2-DCA | 1,1-dichloroethane |
| 1,1-DCE | 1,1-dichloroethene |
| 1,2-DCE | 1,2-dichloroethene |
| 1,1,1-TCA | 1,1,1-trichloroethane |
| trans-1,2-DCE | trans-1,2-dichloroethene |

Section 1

Objectives

This Field Sampling Plan (FSP) has been prepared to support the U.S. Environmental Protection Agency's (EPA) oversight of field sampling and analysis conducted by the Potentially Responsible Parties (PRPs) as part of the remedial investigation/feasibility study (RI/FS) for the Omega Chemical Superfund Site Operable Unit 1 (OU-1). The field activities regarding EPA oversight (i.e., including split sampling) include surface soil, soil gas, ambient air, indoor air, and groundwater sampling within the OU-1 area. No subsurface split samples will be collected by CH2M HILL. This FSP was developed in accordance with EPA Region IX, Guidance for Preparation of a U.S. EPA Region IX, Field Sampling Plan for EPA-Lead Superfund Projects (EPA, 1993).

1.1 Background

The Omega Chemical Corporation (the Site) is a former refrigerant/solvent recycling operation located in Whittier, California, a community of approximately 85,000 people (Figure 1-1). The facility is located across the street from a residential neighborhood and within 1 mile of several schools, including three elementary schools and two high schools. The facility operated as a Resource Conservation and Recovery Act (RCRA) solvent and refrigerant recycling and treatment facility from approximately 1976 to 1991, handling primarily chlorinated hydrocarbons and chlorofluorocarbons. Drums and bulk loads of waste solvents and chemicals from various industrial activities were processed at the Site to form commercial products. Chemical, thermal and physical treatment processes were reportedly used to recycle the waste materials. Wastes generated from these treatment and recycling activities included still bottoms, aqueous fractions, and non-recoverable solvents. Additional data regarding site history and past investigations and remediation activities are discussed in detail in Camp Dresser & McKee's (CDM) OSS RI/FS Work Plan (2003) and Weston Solutions, Inc. (Weston) June 2002 Phase 2 Groundwater Characterization Study Report.

Data obtained in 1988 from site assessment activities, including groundwater and soil sampling conducted by the site owner/operator, Dennis O'Meara, and data from a preliminary assessment conducted by EPA in January 1995, indicated the presence of hazardous substances in subsurface soil and groundwater at the Site, including methylene chloride, tetrachloroethylene, and trichloroethylene. The presence of these substances and deteriorated underground storage tanks at the Site lead EPA to determine that an imminent and substantial endangerment requiring a removal action existed at the Site.

On May 3, 1995, EPA issued an Action Memorandum authorizing a Removal Action involving the following response actions:

- Securing the Site
- Sampling and categorizing hazardous materials

- Removing hazardous substances and grossly contaminated equipment, structures, and debris
- Sampling surface and subsurface soils and groundwater to determine the nature and extent of contamination
- Disposing, stabilizing or treating grossly contaminated soils
- Grading, capping, and fencing contaminated soil areas

EPA has divided the Omega Chemical Superfund Site into two Operable Units: OU-1 and OU-2. OU-1 includes the Omega Chemical Facility property and extends a short distance west-southwest to Putnam Street (Weston, 2003). OU-2 surrounds the Omega Chemical Facility and extends off-site approximately 2.2 miles to the southwest. This FSP describes oversight work to be completed within OU-1.

As part of the OU1 effort, EPA entered into a Partial Consent Decree with the PRPs who had agreed to complete work at the site. This group is known as OPOG (Omega Chemical Site PRP Organized Group). This Partial Consent Decree was entered into the District Court on February 23, 2001. OPOG agreed to perform the following work at the Site:

- Implement an RI/FS for contamination in the vadose zone within what is known as the "Phase 1A area" of the Site (described below);
- Conduct a Non-Time Critical Removal Action (expected to be a groundwater containment system [pump and treat] along the downgradient edge of the Phase 1A area). The Removal Action will involve the following:
 - Preparing an Engineering Evaluation/Cost Analysis (EE/CA) to address groundwater contamination in the Phase 1A area;
 - Preparing an Action Memorandum describing the selected action; and
 - Following public comment, implement the Removal Action.
- Performing a risk assessment for potential contamination resulting from releases of hazardous substances from the Site within the Phase 1A area; and
- Installing up to three groundwater monitoring wells at locations downgradient of the Phase 1A area and upgradient of the City of Santa Fe Springs water supply well 30R3.

1.2 Objectives

The objective of this FSP is to provide field oversight, including split sampling, on behalf of EPA for the field work conducted by OPOG's consultant, CDM. As stated in OPOG's Work Plan (CDM, 2003), the objective of the field investigation is to collect data needed to fulfill the following Work Plan goals:

- Characterize nature and extent of soil contamination at the Site;
- Assess the threat these contaminants pose to human health and the environment;
- Evaluate remedial action alternatives
- Eliminate, reduce, or control risks to human health and the environment at the Site.

OPOG will also conduct additional subsurface investigation (CDM, 2003b) to further characterize the subsurface contaminant distribution and soil and aquifer properties.

The objectives of the EPA oversight are:

- Ensure that OPOG's field activities are completed in accordance with the EPA-approved Work Plan (CDM, 2003);
- Collect and analyze split samples to verify OPOG's sampling results; and
- Ensure that OPOG's Work Plan goals are met.

Figure 1-1 Site Location Map

Section 2

Site Background

2.1 Location and Topography

The Omega Chemical Facility is located at 12504 and 12512 East Whittier Boulevard in Whittier, California (Figure 1-1). The City of Santa Fe Springs is located southwest of the Site. The community of Los Nietos is included within the City of Santa Fe Springs. Unincorporated County of Los Angeles land is located northwest of the site.

The Omega Chemical Facility is located along the base of the La Habra piedmont slope descending from the southwestern flank of the Puente Hills, at an elevation of approximately 220 feet above mean sea level (msl) (Weston, 2003). "The piedmont slope descends toward the southwest at approximately 2.5 percent to a point approximately 2,800 feet southwest of the Omega Chemical Facility. At this point, the ground surface flattens into a broad basin or plain, at an elevation of approximately 150 to 155 feet msl. In the southwestern part of the study area, the ground surface ascends a low rise at the northwest end of the Santa Fe Springs plain, at an approximate elevation of 160 feet msl (Weston, 2003)." The site and surrounding areas are completely developed. The Sorenson Avenue drain is a small channelized drainage that flows southeast from the intersection of Dice Road and Slauson Avenue and becomes La Canada Verde Creek to the south of the OU-2 study area (Weston, 2003). La Canada Verde Creek cuts a low gap between the Coyote Hills on the east and the Santa Fe Springs Plain on the west (Weston, 2003).

2.2 EPA Activities in the OU-1 Area

CDM, acting as OPOG's consultant, is conducting a RI/FS for OU-1. EPA is acting as the lead oversight agency, and CH2M HILL is providing field oversight on behalf of EPA. Specific field activities are described in Section 3.

2.3 Hydrogeology

This section summarizes the site regional hydrogeological setting and site-specific hydrogeologic conditions.

2.3.1 Regional Hydrogeology

The following information on regional hydrogeological setting is largely based on the California Division of Water Resources (CDWR) Bulletin 104 (1961).

The site is located in the Central Basin of the Coastal Plain of Los Angeles County. The Coastal Plain is bounded on the west and south by the Pacific Ocean and by mountains on the north, east, and southeast. The Coastal Plain is underlain by an extensive groundwater basin in Los Angeles and Orange Counties.

Water-bearing sediments identified in the Whittier area extend to an approximate depth of at least 1,000 feet below the ground surface (bgs). The identified geologic units consist of Recent alluvium, the upper Pleistocene Lakewood Formation and the lower Pleistocene San Pedro Formation. Figure 2-1 shows a generalized stratigraphic column of water-bearing sediments in the Whittier area.

As reported by CDWR (1961) the uppermost unit in the vicinity of the Omega site consists of the "Bellflower Aquiclude." The Bellflower Aquiclude comprises all the fine-grained sediments that extend from the ground surface down to the first aquifer (Figure 2-1). The Bellflower Aquiclude consists primarily of clay and sandy clay to silt, and ranges from 20 to more than 40 feet in thickness in this area. CDWR (1961) considers the Bellflower Aquiclude to be present in both the recent alluvium and the upper part of the Lakewood Formation (Figure 2-1). In the Whittier area, the Bellflower Aquiclude is considered to be entirely within the Lakewood Formation. Water-bearing zones locally occurring within the Bellflower Aquiclude are referred to collectively and informally as the Semiperched Aquifer.

The Lakewood Formation consists of non-marine deposits of Late Pleistocene age and attains a maximum thickness of 70 feet. The Gage Aquifer is the major water-bearing member and comprises the basal lithologic unit of the Lakewood Formation (Figure 2-1). It consists of about 30 feet of sand with some interbedded clay. Based on previous investigation at the Omega site, the Gage Aquifer appears to be absent beneath the site proper. A sand interval found in exploratory borings a short distance southwest of the site is believed to correlate with the Gage Aquifer (England and Hargis, 1996). The Gage aquifer is interpreted by CDWR (1961) to extend eastward approximately 2.5 miles south of the site. However, exploratory borings suggest the Gage is present west of the Omega site; but pinches out or disappears towards the east. The Gage aquifer does not appear to be an important source of drinking water in the Whittier area, based on elevated total dissolved solids (TDS) concentrations observed during sampling, and none of the local water supply wells produce water from this aquifer.

Underlying the Lakewood Formation are primarily marine sand and gravels with interbedded clay, assigned to the San Pedro Formation. The San Pedro Formation reaches a maximum thickness of 850 feet and extends to a depth of about 920 feet. The San Pedro Formation unconformably underlies the Lakewood Formation. The San Pedro Formation has been subdivided into five named aquifers separated by clay members. A fine-grained layer is also typically present at the top of the sequence, although in localized areas, the uppermost San Pedro Formation aquifer may be merged with the overlying aquifer, and one or more of the five aquifers may also be merged (CDWR, 1961). This suggests that the Gage sand unit could directly overlie and be in hydraulic connection with San Pedro Formation aquifers in the vicinity of the Omega site. Subsurface explorations conducted near the site to date, however, have identified clays underlying the suspected Gage-equivalent sand unit.

The five aquifers defined within the San Pedro Formation include, from top to bottom, the Hollydale, the Jefferson, the Lynwood, the Silverado, and the Sunnyside (Figure 2-1). The upper two aquifers are less extensive and appear to be absent in the immediate vicinity of the Omega site.

The San Pedro aquifers consist of varying amounts of sand and gravel with some interbedded clay. The thickness of the aquifers increase with depth. The shallow Hollydale

aquifer ranges from 10 to 25 feet whereas the deepest Sunnyside Aquifer ranges from 200 to 300 feet. The base of the Sunnyside Aquifer reaches a maximum depth of about 1000 feet bgs (CDWR, 1961). The San Pedro Formation aquifers are the primary source of water for the production wells in the area.

The Pliocene and Miocene sediments below the San Pedro Formation (Figure 2-1) generally contain saline water in the area, but locally contain freshwater (CDWR, 1961).

Based on a record search by England-Hargis (1996), there are 6 water supply wells within 1.5 miles of the site. The nearest well (02S/11W30-R3, also known as Santa Fe Springs Well No. 1) is located 1.3 miles to the west southwest of the former Omega facility. The well is screened at 200 to 288 feet bgs and 300 to 900 feet bgs. Trichloroethylene (TCE) (0.7 micrograms per liter [$\mu\text{g/L}$]) and chloroform (1.3 $\mu\text{g/L}$) were detected in water samples collected from the well in October 1994. The Los Nietos water supply well (02S/11W30-Q5) is located about 1.5 miles southwest of the site. This well is screened from 152 to 370 feet bgs. Perchloroethylene (PCE) and TCE were detected at unknown concentrations in 1986-90. The remaining wells are no longer operating, are used for irrigation, or no data were available.

2.3.2 Site Hydrogeology

The hydrogeology of the Omega site has been explored with borings and Cone Penetrometer Testing (CPT). The site is underlain by low permeability silty and clayey soils to a depth of at least 120 feet. No significant water producing sand units have been found directly beneath the site in any of the exploratory borings. A sand unit, which may correlate with the Gage Aquifer, has been encountered approximately 600 feet southwest of the site beneath Putnam Street. Groundwater occurs at approximately 70 feet bgs. Locally, groundwater flow appears to be generally to the southwest. CDM (1999) reported a local direction of groundwater flow towards the southwest with a hydraulic gradient of 0.009 feet per foot (ft/ft). TDS concentrations of greater than 3,000 milligrams per liter (mg/L) were reported in shallowest groundwater samples collected by CDM (1999).

The hydraulic conductivity of the upper silty unit was estimated from step-drawdown tests conducted in monitoring well OW2 and a slug test at well OW1. The hydraulic conductivity in this area was found to range from 0.8 to 1.6 feet per day (CDM, 2003).

2.4 Water Quality

Groundwater at the site has been impacted primarily by chlorinated hydrocarbons and Freon compounds (i.e., volatile organic compounds [VOCs]). The following summary is based on the results of Phase 2 Groundwater Characterization Study (Weston, 2003).

The five primary chlorinated compounds detected in groundwater are:

- PCE (also known as tetrachloroethene)
- TCE (also known as trichloroethene)
- 1,1-dichloroethene (1,1-DCE)
- Cis-1,2- dichloroethene (cis-1,2-DCE)
- Chloroform

These are the most widespread VOCs detected in groundwater in the vicinity of the Site.

Eight other VOCs were locally detected in groundwater in lower concentrations. These compounds include:

- 1,2-dichloroethane (1,2-DCA)
- 1,1-dichloroethane (1,1-DCA)
- 1,1,1-trichloroethane (1,1,1-TCA)
- Trans-1,2-dichloroethene (trans-1,2-DCE)
- 1,2-dichloropropane
- Vinyl chloride
- Methylene chloride
- Carbon tetrachloride

Freon compounds reportedly detected at the site include:

- Trichlorofluoromethane (also known as Freon 11)
- Trichlorotrifluoromethane (also known as Freon 113)

Groundwater samples collected from monitoring wells at the site were also analyzed for metals, total organic carbon (TOC), total nitrogen, sulfate, sulfide, and methane/ethane/ethene. Elevated total chromium concentrations were detected in groundwater samples collected from monitoring wells at the site (Weston, 2003).

Figure 2-1 Generalized Stratigraphic Column

Section 3

Rationale for Sample Locations, Number of Samples, and Laboratory Analyses

This section presents a description of the split sample collection that CH2M HILL will conduct on behalf of EPA during OPOG field sampling activities at the Omega Chemical Superfund Site OU-1.

A description of the sample locations, the rationale for the sample locations, number of samples, and laboratory analyses to be performed by OPOG is presented in Section 6.0 of OPOG's Work Plan (CDM, 2003a). On-and off-site sampling locations collected by the PRPs and approved by EPA are presented in ~~Appendices A and B~~ Figures 3-1 and 3-2, respectively, of this FSP, and groundwater sampling locations are shown in ~~Appendix C~~ Figure 3-3. OPOG will also conduct additional soil and groundwater sampling (CDM, 2003b).

A description of the number of split samples that will be collected by CH2M HILL and the laboratory analyses to be performed on those samples are described below. The number of samples collected may vary depending upon changes in scope of work. It is assumed that split samples will be collected for 10 percent of the planned OPOG samples. The same or equivalent analytical methods conducted by OPOG will be conducted on split samples.

3.1 Surface Soil Sample Collection

3.1.1 Assessment of Regulatory Requirements

The surface soil samples collected by OPOG will be analyzed to support a screening risk evaluation. The screening risk evaluation will include a comparison of surface soil sample results with EPA Region IX Preliminary Remediation Goals (PRGs).

3.1.2 Sampling Locations

OPOG's surface soil sampling locations are shown in ~~Appendix A~~ Figure 3-1. Split samples will either be randomly collected or collected based on field observations that indicate the possible presence of contamination.

3.1.3 Number of Samples

It is anticipated that four split surface soil samples will be collected by CH2M HILL, plus quality control (QC) samples in accordance with Section 5.5. This is approximately 20 percent of the OPOG samples; this higher percentage was chosen because of expected high variability of the soil sample analytical results.

3.1.4 Laboratory Analyses

All split surface soil samples will be analyzed for semivolatile organic compounds (SVOCs) using EPA Method 8270C and pesticides and polychlorinated biphenols (PCBs) using EPA Method 8081A/8082. Future sampling may also require analysis for VOCs using EPA Method 5035.

3.2 Subsurface Soil Sample Collection

3.2.1 Assessment of Regulatory Requirements

The subsurface soil samples will be collected and analyzed in support of characterizing the site soil conditions. The planned sample analyses are not driven by regulatory limits. Future site investigation efforts may also include sampling to characterize subsurface contaminant distribution.

3.2.2 Sampling Locations

OPOG's subsurface soil sampling locations are shown in Figure 3-1. Oversight will include observation of OPOG's field activities and review of laboratory results. The planned subsurface analytical results will not be used in any regulatory decisions. The locations of future samples for characterization the contaminant distribution will be subject to regulatory oversight.

3.2.3 Number of Samples

No split subsurface soil samples are expected to be collected by CH2M HILL.

3.2.4 Laboratory Analyses

OPOG's subsurface soil samples will be analyzed for redox potential using EPA Method 2850B, organic carbon content using SW-846 Method 9060 Modified, cation exchange capacity using SW-846 Method 9081, and moisture content using American Society for Testing and Materials (ASTM) Method D2216. Future sampling may also require analysis for VOCs using EPA Method 5035, SVOCs using EPA Method 8270C, and pesticides and polychlorinated biphenols (PCBs) using EPA Method 8081A/8082.

3.3 Soil Gas Duplicate Sample Collection

3.3.1 Assessment of Regulatory Requirements

The objective of the sampling is to establish a lateral boundary of the contaminated soil and provide data to evaluate vapor migration potential for the risk assessment. The risk assessment will evaluate the site based on EPA Region IX PRGs.

3.3.2 Sampling Locations

Soil gas samples will be collected at the former Omega Chemical Site as well as at the former Cal-Air facility. The soil gas sampling locations are shown on figures presented in Figure 3-1 and Figure 3-2.

3.3.3 Number of Samples

Two duplicate soil gas samples will be collected by CH2M HILL.

3.3.4 Laboratory Analyses

Soil gas samples will be analyzed for VOCs using EPA Method 8260 (TO-14). One matrix spike duplicate MSD sample will also be collected and analyzed for VOCs using EPA Method 8260 (TO-14).

3.4 Indoor and Ambient Air Duplicate Sample Collection

3.4.1 Assessment of Regulatory Requirements

The objective of the sampling is to establish background contaminant concentrations for the risk assessment. The risk assessment will evaluate the site based on EPA Region IX PRGs.

3.4.2 Sampling Locations

OPOG's indoor air sampling locations will be selected to be distant from areas used for storage of paints, cleaning products, or other potential sources of chemicals to indoor air. EPA will provide input to CDM on the selection of appropriate indoor air sampling locations. OPOG will collect two ambient air samples from the Site. Samples will also be collected from two locations upwind of the Site. CDM will use a wind sock to evaluate wind direction and sample locations will be selected following evaluation of site-specific meteorology. Split samples will either be randomly collected or collected based on field observations that indicate the possible presence of contamination. Ambient and indoor air samples are not shown on a figure.

3.4.3 Number of Samples

It is anticipated that two split air samples will be collected by CH2M HILL, plus QC samples in accordance with Section 5.5. This is approximately 10 percent of the OPOG samples.

3.4.4 Laboratory Analyses

Air samples will be analyzed for VOCs using EPA Method 8260 (TO-14). One MS (matrix spike)/MSD sample will also be analyzed for VOCs using EPA Method 8260 (TO-14).

3.5 Groundwater Duplicate Sample Collection

3.5.1 Assessment of Regulatory Requirements

The groundwater sampling and analysis will be conducted partially in support of the screening risk assessment. The risk assessment will evaluate the site based on the State of California maximum contaminate limits (MCLs).

3.5.2 Sampling Locations

Groundwater sampling locations are shown in Figure 3-3.

3.5.3 Number of Samples

Twelve duplicate groundwater samples will be collected by CH2M HILL from monitoring wells located at the former Omega Chemical Company property as well as from monitoring wells located offsite from the former Omega Chemical Company. Three duplicate groundwater samples will be collected during each round of semi-annual sampling. One duplicate sample will always be collected from the most contaminated well, OW-1. The other two duplicate samples will be collected randomly from other site wells.

3.5.4 Laboratory Analyses

Groundwater samples will be analyzed for VOCs using EPA Method ~~2860B~~8260. MS/MSD samples will also be analyzed for VOCs using EPA Method ~~2860B~~8260.

3.6 Sample Labeling

Each collected sample and QC sample, including equipment rinsate blanks, will be clearly labeled with a label covered with clear adhesive tape. An example sample identification and explanation follows:

OC-OU1-10

OC will be used as a sample ID prefix on all samples to denote that the sample was collected as part of the Omega Chemical investigation. OU1 or OU2 will follow the prefix to denote which operable unit (OU1 or OU2) the sample was collected from; this sampling effort is conducted entirely for OU1. OU1 will then be followed by a sequential number denoting the order in which the sample was collected.

Figure 3-1 *On-Site Sample Location Map*

blank page

Figure 3-2 Off-Site Sample Location Map

blank page

Figure 3-3 Groundwater Sample Location Map

blank page

Section 4

Request for Analyses

This section presents the request for analyses (RFA) and anticipated sampling schedule.

4.1 Analytical Parameters

Table 4-1 summarizes the analytical parameters, and test methods for the samples that will be collected and submitted during the OU-1 soil, air, and groundwater sampling events. Table 4-1 indicates, where possible, the laboratory anticipated performing each of the analyses. ~~In addition, the~~ The table indicates the sample preservation requirements, analytical holding times, and sample container requirements. Target compound lists and reporting limits for all samples to be collected during this project [as designated by CDM (2003) and approved by EPA] are included in Appendix ~~A~~D.

4.2 Schedule

Scheduling of soil, soil gas, air, and groundwater sampling events will be coordinated with OPOG and their contractor (CDM). It is anticipated that the sampling activities will start in ~~January 2004~~late October-early November 2003.

Ongoing groundwater sampling events will be conducted on a semi-annual basis to evaluate changes in the extent of the VOC plume. The ongoing sampling schedule will be coordinated with OPOG and CDM.

Table 4-1 Request for Analyses
Page 1 of 1

Section 5

Field Methods and Procedures

This section of the FSP provides information on field activities associated with the split sampling at the Omega Chemical Superfund OU-1 RI/FS. Included in this section are methods and procedures for the following:

- Split sample collection
- Sample containers and preservatives
- Sample management and documentation
- Quality control samples

5.1 Sample Collection

Split surface soil, subsurface soil, soil gas, ambient air, indoor air, and groundwater samples will be collected during the field activities at the Omega Chemical Superfund OU-1 Site. Sample collection procedures are described in detail in Section 6 of OPOG's Work Plan (CDM, 2003). CH2M HILL will collect samples using laboratory-supplied sample containers. All hand augering, drilling, pumping, and other sample collection related activities and equipment will be conducted and supplied by CDM. All sampling equipment will be decontaminated by CDM between sample locations. A brief summary of OPOG's sampling techniques (CDM, 2003) is provided below.

5.1.1 Surface Soil Samples

~~After completion of CDM's sample collection, CH2M HILL will collect~~ receive split soil samples ~~using the same equipment and techniques used collected by CDM.~~ The samples will be collected in 6-inch long stainless steel sleeves using a hand auger and slide hammer. CDM staff will operate the sampling equipment. The sleeves will be sealed on each end using Teflon® sheets and plastic end caps.

5.1.2 Subsurface Soil Samples

Following the completion of concrete coring, subsurface soil samples will be collected by CDM using direct-push drilling techniques. Subsurface soil samples will be collected in 3-foot long sleeves.

5.1.3 Soil Gas Summa Canister Samples

Soil gas samples will be collected by CDM using direct-push drilling techniques and a Simulprobe sampler (or approved equal). Soil gas samples will be collected in laboratory-supplied pre-cleaned and evacuated Summa canisters. ~~CH2M HILL will connect the Summa canister to CDM's sampling apparatus and collect split soil gas samples immediately after the completion of CDM's sample collection.~~

5.1.4 Ambient and Indoor Air Summa Canister Samples

Split indoor and ambient air samples will be collected using the same type of sampling equipment used by CDM. The sampling devices will consist of 6-liter stainless steel Summa canisters that have a critical orifice air flow controller attached to each canister that meters flow over an 8-hour period (CDM, 2003).

5.1.5 Groundwater Samples

CH2M HILL will use laboratory-supplied 40-milliliter (mL) volatile organic analysis (VOA) vials and collect groundwater samples from the outlet used by CDM immediately after CDM has completed their sample collection. Groundwater field parameters will be monitored by CDM personnel. CH2M HILL will record split groundwater parameters from CDM's equipment during well purging prior to sample collection.

5.2 Sample Containers and Preservatives

Sample container requirements and preservation methods for each analysis are summarized in Table 4-1. Sample containers will be laboratory-provided or purchased with certificates of cleanliness from approved laboratory product suppliers. A summary of the sample containers and holding times is provided below. CH2M HILL will provide the sample containers for all media sampled. The split samples will be collected from OPOG's samples or using OPOG's sampling equipment.

5.2.1 Surface Soil Samples

Surface soil samples to be analyzed for SVOCs and pesticides/PCBs will be collected in 6-inch long brass sleeves by CDM and cooled to 4 degrees Celsius (°C). The maximum holding time for SVOCs and pesticides/PCBs will be 14 days for extraction and 40 days for analysis of the extract. Samples for VOC analysis will be collected using Encore samplers by CH2M HILL and frozen using dry ice. The maximum holding time for VOCs is 14 days.

5.2.2 Subsurface Soil Samples

Subsurface soil samples to be analyzed for redox potential, carbon content, cation exchange capacity, and moisture content will be collected by CDM in 8-ounce glass jars. The samples to be analyzed for redox potential will be analyzed immediately. The maximum holding time for carbon content analysis will be 28 days. No holding time is specified for moisture content analysis. Cation exchange capacity analysis will have a holding time of 7 days until drying and 8 months after drying (CDM, 2003).

Surface soil samples to be analyzed for SVOCs will be collected in 6-inch long brass sleeves by CDM and cooled to 4 degrees Celsius (°C). The maximum holding time for SVOCs will be 14 days for extraction and 40 days for analysis of the extract. Samples for VOC analysis will be collected using Encore samplers by CH2M HILL and frozen using dry ice. The maximum holding time for VOCs is 14 days.

5.2.3 Soil Gas Samples

Soil gas samples to be analyzed for VOCs will be collected in Summa canisters by CH2M HILL from OPOG's sampling equipment. The maximum holding time for VOC analysis will be 14 days.

5.2.4 Ambient and Indoor Air Samples

Ambient air samples to be analyzed for VOCs will be collected in Summa canisters by CH2M HILL from OPOG's sampling equipment. The maximum holding time for VOC analysis will be 14 days.

5.2.5 Groundwater Samples

Samples to be analyzed for VOCs will be collected by CH2M HILL from OPOG's sampling equipment in ~~two~~ three 40-mL glass VOA vials. A sufficient amount of 1:1 hydrochloric acid (HCl) will be placed inside the vials to lower the sample pH to less than 2.

Samples will be tested to ensure sufficient preservatives have been added (e.g., a test bottle or vial). The test bottles will be filled and checked to determine if sufficient preservatives have been added using the following (or similar) steps:

- Add preservative to test sample vial
- Fill with sample, cap, and invert to ensure mixing
- Test the pH to determine if greater than 2 is achieved; if so, add same amount of preservative to the actual sample vial and collect the sample; discard the test vial
- Add more preservative and repeat until pH greater than 2 is achieved

Many laboratories provide pre-acidified VOA-sample vials and these will be used, if available from the laboratory. A field check of the amount of preservative contained in the pre-acidified VOA vials will be conducted similar to the approach described above, in order to confirm that sufficient preservative has been provided. If the pre-acidified VOA vials do not contain enough preservative to achieve the proper pH (greater than 2), additional preservative will be added to the vial and repeated until the proper pH is achieved. This additional amount of preservative will then be added to each sample container prior to collection of samples.

The vials will be filled so that no headspace is present after sample collection. Filled containers will be checked by inverting the vial and tapping to reveal any air bubbles. If air bubbles are present, containers will be emptied, re-acidified, and refilled. If, after several attempts at sample collection, air bubbles remain, the sample will be described in the field notebook as an "aerated sample." VOA vials will be cooled to 4°C and stored away from sunlight prior to shipping by immediately placing the full sample bottle into an iced cooler. The maximum analytical and contract holding times for VOCs will be ~~14~~ 14 days.

5.3 Decontamination

Field equipment used during sampling activities will be decontaminated by CDM using procedures outlined in Section 6 of OPOG's Work Plan (CDM, 2003).

5.4 Sample Management Procedures and Documentation

The following section discusses various sample management procedures that will be followed during the performance of field activities. Included in these sections are procedures for sample packaging and transportation, sample labeling and sample documentation.

5.4.1 Sample Packaging and Shipment

The sample packaging and shipment procedures are outlined below.

5.4.1.1 Preparation of Sample Coolers

The following steps will be used to prepare the sample coolers:

1. Remove all previous labels used on the cooler.
2. Seal all drain plugs with tape (inside and outside).
3. Place a cushioning layer of recyclable cornstarch popcorn or bubble wrap at the bottom of the cooler.
4. Line the cooler with a large plastic bag to contain samples.
5. Double-bag all ice in resealable plastic bags and seal.

5.4.1.2 Packing Samples in Coolers

The following steps will be used to pack the samples in coolers:

1. Place the chain-of-custody (COC) form in a resealable bag and tape to the underside of the cooler lid.
2. Make sure that all glass sample containers are packaged in bubble wrap, secured with clear mailing tape.
3. Place samples in an upright position in the cooler.
4. Fill the void space between samples with recyclable cornstarch popcorn, double-bagged ice, or bubble wrap.
5. Place ice on top of and between the samples.
6. Fill the remaining voids with recyclable cornstarch popcorn or double-bagged ice.
7. Custody seal large plastic bag containing samples and packing material.

5.4.1.3 Closing and Shipping of Cooler

Coolers will be packed with packing material surrounding the bottles to prevent breakage during transport. Ice will be sealed in plastic bags to prevent melting ice from soaking the packing material. Sample documentation will be enclosed in sealed plastic bags taped to the underside of the cooler lid. Coolers will be secured with packing tape and custody seals as described in the steps below.

1. Tape the cooler lid with strapping tape, encircling the cooler several times.
2. Place COC seals on two sides of the lid (one in front and one on the side).
3. Place "This Side Up" arrows on the sides of the cooler.

The coolers will then be delivered to the appropriate laboratory by the sampling team or by overnight courier the day of sample collection. Samples will only be shipped on Friday, if the laboratory provides assurance that analytical holding times will not be exceeded.

5.4.2 Sample Labeling

The following information will be written on each sample container label with a permanent marker and will be covered with clear plastic tape:

- Sample location number (if the contract laboratory program [CLP] sticker is used)
- Case number, if applicable
- Type of analysis requested
- Preservative used
- Date and time collected

Custody seals will be placed over the lids of each sample container. Custody seals on the VOA vials will be placed around the lid to prevent covering the septum.

Immediately following sample collection, the filled sample containers with completed labels will be sealed with custody seals, placed in plastic resealable bags, and placed in a cooler containing ice. VOA vials (three vials per sample) will be wrapped together in bubble wrap, secured with tape, and placed into labeled, plastic resealable bags. All other glass bottles will be bubble-wrapped, and placed into labeled plastic resealable bags.

The sampling will be coordinated with the Region 9 Sample Coordination Center. An analytical request form will be sent one to two weeks prior to a scheduled sampling event.

5.4.3 Sample Documentation

5.4.3.1 Field Notebooks

Bound and numbered logbooks will be used to record all sampling information. Information in the logbooks will include, at a minimum, the following:

- Name and title of the recorder, and date and time of entry
- General description of weather conditions
- Personnel involved with the activities
- Photographic log, if appropriate

- Sampling location and description
- Location of duplicate and QC samples, date and time of collection, parameters to be analyzed, sample identification (ID) numbers, blank ID numbers, whether or not split samples were collected, and if so, for whom
- Condition of well being sampled
- Record of parameter values obtained during purging
- Time of sampling
- Sample description
- Shipping addresses for laboratories
- Names of visitors, their associations, and purpose of visit
- Unusual activities such as departures from planned procedures
- References to important telephone calls

All logs will be completed, signed, and dated by the recorder. All information recorded in the logs will be written with waterproof ink. Corrections will be made by crossing out the error with a single horizontal line, initialing the correction, and entering the correct information. Crossed-out information must be readable.

5.4.3.2 Chain-of-Custody Forms

Chain-of-custody procedures will be used to maintain and document sample collection and possession. After sample packaging, the following one or more of the COC paperwork forms will be completed, as necessary, for the appropriate samples:

- Organic traffic report and chain-of-custody record
- Inorganic traffic report and chain-of-custody record
- EPA Region IX Chain-of-Custody Record
- Overnight shipping courier air bill

Copies of the above forms will be filled out and distributed per instructions for sample shipping and documentation in Appendix BE. Completed field quality assurance/quality control summary forms will be sent to the RSCC at EPA's Region IX Quality Assurance Office (QAO) at the conclusion of each sampling event.

5.5 Quality Control Samples

The QC samples will be collected or prepared to assist in determining data reliability. These QC samples include field duplicates, field blanks, and laboratory QC samples (for MS and MSDs). The QC samples are normally collected from locations that are suspected to be of moderate contamination. The QC samples will be collected by CDM immediately following, and using the same procedures as, the collection of the target sample. CH2M HILL will collect split samples of approximately 10 percent of the QC samples (field duplicates and field blanks) collected by CDM. CH2M HILL will collect trip blanks as QC samples for the oversight effort.

5.5.1 Field Blanks

The field blanks are collected to verify that contamination is not introduced to samples during collection, handling, or shipping of the samples. They will be prepared by CDM by pouring blank water directly into the sample bottles (true field blanks) or by pouring blank water over or through decontaminated sampling equipment (equipment blanks).

Commercially prepared high pressure liquid chromatography (HPLC) water will be used for organic analyses and reagent-grade deionized water for inorganic analyses using the same preservation methods and packaging and sealing procedures used during collection of groundwater samples. Field blanks will be prepared and labeled in the same manner as the field samples and sent "blind" to the laboratory.

5.5.2 Laboratory QC Samples

Laboratory QC samples will be collected by CDM to perform MS and MSD analyses. An MS is an aliquot of a sample spiked with a known concentration of target analytes and provides a measure of the method accuracy. The MSD is a laboratory split sample of the MS, and is used to determine the precision of the method.

Twice the normal water volume will be collected for laboratory QC samples. Laboratory QC samples will be labeled as such on sample bottles and paperwork.

5.5.3 Trip Blanks

Trip blanks are used to assess the potential introduction of contaminants from sample containers or during the transportation and storage procedures. A trip blank consists of a VOC sample vial filled in the laboratory with HPLC-grade water, transported to the sampling site, handled like an environmental sample, and returned to the laboratory for analysis. Trip blanks are not opened in the field, are prepared only when VOC samples are collected, and analyzed only for VOCs.

5.5.4 Temperature Blanks

Temperature blanks will be included with each cooler shipment containing samples (regardless of targeted analysis) sent to the laboratory. A temperature blank consists of a VOC sample vial filled in the field with de-ionized water, handled like an environmental sample, and returned to the laboratory for analysis. The temperature blank provides a means of verifying that samples have been maintained at the proper temperature (4 °C) following collection and during transport to the laboratory.

Section 6

Health and Safety Plan

The Health and Safety Plan for the activities described in this SAP is provided in Appendix C. A hospital location map is provided as Figure 6-1.

Figure 6-1 *Hospital Map in Health and Safety Plan*

Section 7

References

Camp Dresser and McKee. 2003a. Final On-Site Soils Remedial Investigation/Feasibility Study Work Plan. September 29.

Camp Dresser and McKee. 2003b. Memorandum Additional Investigation in the Phase 1a Area. November 2003.

Camp Dresser and McKee. 1999. Draft Phase 1a Pre-Design Field Investigation Report, Omega Chemical Superfund Site. October 13.

California Department of Water Resources. 1961. Bulletin 104. Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County Appendix A Groundwater Geology.

England & Associates and Hargis and Associates, Inc. 1996. Phase II Close Out Report, Omega Chemical Site. October 1.

Weston Solutions, Inc. Omega Chemical Superfund Site Whittier California Phase 2 Groundwater Characterization Study. June 2003.

Appendix A

Target Compound Lists and Reporting Limits

Appendix B

Sample Shipping and Documentation Instructions

Appendix C

Health and Safety Plan